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AUTHOR Elliott, John
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ABSTRACT

Curriculum reformers in the United Kingdom who have expressed concern with the failure of the research, development, and diffusion model to implement inquiry/discovery learning have tended to offer a problem-solving approach to foster innovation at the classroom level. This approach is illustrated in the Ford Teaching Project, sponsored by the Ford Foundation and based at the Centre for Applied Research in Education at the University of East Anglia, United Kingdom, from 1973-75. The project involved 40 teachers from 12 schools in a program of action research on the problems of implementing inquiry/discovery approaches in the classroom. They were supported by a central team of three: two full-time researchers and a secretary. In addition, two district supervisors were designated to help support the work of the teachers in their area on a part-time basis. The teachers were grouped in interdisciplinary school teams that were to meet frequently to discuss teaching problems and share ideas about methods of collecting data. Twice a term, arrangements were made for interschool meetings of two - four teams. During the four terms that the project lasted all the teachers were brought together for three, four-day residential conferences. The original research plan presented action-research tasks, roles, methods of data collection, and reporting procedures. A number of problems arose because a majority of the teachers felt they were already using inquiry/discovery methods proficiently. This necessitated the introduction of a self-monitoring concept, which was initiated by a triangulation method--gathering viewpoints of three groups, students, teachers, and participant-observers. The data was then used by the teachers to clarify, test, and generate theories. (DMT)

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TEACHERS LEARN ABOUT INQUIRY/DISCOVERY APPROACHES

John Elliott
Cambridge Institute of Education
Cambridge, United Kingdom

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THIS PAPER WAS ADAPTED BY MARGO JOHNSON FROM A CONTRIBUTION TO A SYMPOSIUM ON "MODES OF THOUGHT AMONG TEACHERS" AT THE ANNUAL MEETING OF THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION, SAN FRANCISCO, APRIL 19-23, 1976.

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The Ford Teaching Project was sponsored by the Ford Foundation and based at the Centre for Applied Research in Education at the University of East Anglia, United Kingdom, from 1973-75. It was an attempt to involve 40 teachers in a program of action research on the problems of implementing inquiry/discovery approaches in classrooms.

The project developed because the curriculum reform movement, sponsored by the Nuffield Foundation and the Schools Council in the United Kingdom, has largely failed at the level of classroom implementation. The fundamental problem of curriculum reform lies in the clash between the theories of the reformers and the theories implicit, often unconsciously, in the practice of teachers. Reformers fail to realize that fundamental changes in classroom practice can only be brought about if teachers become conscious of the theories that guide their practice and are able to reflect critically about them.

Perhaps the notable exception among curriculum reformers in the United Kingdom is Lawrence Stenhouse, Director of the Schools Council Humanities Project. Concerned with helping teachers to handle controversial issues with adolescents, Stenhouse and his team defined a set of teaching principles for discussion-based inquiry aimed at an understanding of issues. From the work of this project, it became clear that many of the problems of implementing discussion-based in-

quiry approaches were caused by the habitual and unconscious behavior patterns of teachers. For example, students' failure to discuss ideas could be explained in terms of teachers' tendencies to invite consensus, reinforce some views rather than others, and promote their own views. Only by becoming aware of these tendencies and reflecting about the theories implicit in them were teachers able to modify their behavior. It also became clear that many of the salient patterns referred to could be generalized across classrooms, subject areas, and schools. This observation suggested the possibility of teachers from diverse situations getting together to develop collaboratively a practical theory of inquiry/discovery teaching.

Organizational Framework

Forty teachers were invited to join the project from 12 schools, including junior (ages 7-11), middle (ages 8-12 or 9-13), and secondary schools (ages 11 or 13+). They were supported by a central team of three: two full-time researchers--Clem Adelman and John Elliott--and a secretary, who was also responsible for coordinating liaison between schools and between schools and the central team. In addition, two district supervisors were designated to help support the work of teachers in their area on a part-time basis. The teachers were grouped in interdisciplinary school teams that we hoped would meet frequently to discuss teaching problems and share ideas about methods of collecting data. Twice a term, arrangements were made for inter-school meetings of two to four teams. The meetings, convened by the district supervisors, brought teachers together from the different kinds of schools involved. During the four terms that the project

lasted, all the teachers were also brought together for three 4-day residential conferences--at the beginning, halfway through, and at the end. These conferences provided a context for teachers to communicate across established educational boundaries. House[1] has argued that lateral communication between teachers increases rewards from peers and feeds professional ambition. It therefore threatens hierarchical control over teachers' access to ideas and has political implications for increasing their professional autonomy. It was our view that lateral communication about classroom problems increases teacher autonomy because it supports critical reflection about practice and thereby gives teachers greater control over their own behavior.

The Project's Design as Classroom Action Research

Those curriculum reformers in the United Kingdom who have expressed concern with the failure of the research, development, and diffusion model to secure implementation have tended to offer a problem-solving approach as a possible solution to fostering innovation at the classroom level. The essential features of the problem-solving approach are:

- its focus on practical problems defined by practitioners;
- collaboration between outsiders and practitioners, who in dialogue seek solutions to the practitioners' problems.

Initially these reflected the basic elements of our project design, with one exception. Our design reflected a concern for generalization. We wanted teachers not only to monitor their own problems and develop practical hypotheses about how they arose and could be resolved, but

[1] Ernest House, The Politics of Educational Innovation (Berkeley, Calif.: McCutchan Publishing Corp., 1974).

also to explore the extent to which these problems and hypotheses could be generalized to other teachers' classrooms. We borrowed the term "action research" to describe this approach, and we came to prefer it, rather than "problem-solving," as a description of our design.

In early 1973, we started to recruit teachers who were experiencing some dissonance between their practice and their aspirations to implement inquiry/discovery approaches. However, it was difficult from our position as university researchers to get access to such teachers. Approaches had to be made down the hierarchy from district administrators to headteachers. Once approached by their district, headteachers tended to feel under some obligation to involve their staff. So by the time we met groups of "interested" teachers in schools, it was difficult to determine how the project had been communicated to them and whether their motives for joining stemmed from a genuine desire to reflect about their classroom problems. The difficulties this presented for us became clear when we tried to explain the idea of collaborative action research to the 40 teachers who assembled for our first conference in spring 1973. Rather naively, we assumed they were all anxious to "get cracking" on some systematic reflection on their classroom problems. We outlined the main purpose of the conference as the negotiation of research tasks, roles, procedures, and methods and produced a document to serve as the basis for discussion. The idea was to revise the document as a result of discussion and distribute it as an agreed contract between the teachers and us. A brief summary of the document follows:

A. Action-Research Tasks

1. to identify and diagnose in particular situations the problems that arise from attempts to implement inquiry/discovery approaches effectively, and to explore the extent to which problems and diagnostic hypotheses can be generalized;

2. to develop and test practical hypotheses about how the teaching problems identified might be resolved and to explore the extent to which they can be generally applied;

3. to clarify the aims, values, and principles implicit in inquiry/discovery approaches by reflecting about the values implicit in the problems identified.

B. Roles

Responsibility for the action-research tasks is to be shared between teachers and the central team working in dialogue. The central team will also take some responsibility for circulating the reports of school teams to other schools.

C. Methods of Data Collection

1. teacher field notes on classroom problems and teachers' reactions to them;

2. student diaries of lessons (students will have control over teacher access to the diaries);

3. teacher-student discussions about classroom problems, using teacher field notes and student diaries as resources;

4. tape recording of classroom events as checks of teachers' and students' retrospective accounts of lessons;

5. case studies of problems and strategies with a particular class of students during the last term, based on data collected by the methods and techniques outlined above.

D. Reporting Procedures

At the end of each term each coordinator of a school team will send the central team a report on team meetings within

the school. The report will cite common problems, and hypotheses identified by the team.

Our attempt to negotiate teacher participation resulted in a rather reserved acceptance of our document in principle with some suggested alterations. The teachers' general reaction was that they did not have time to carry out the tasks in the ways suggested. We realized that such skepticism is often well founded. Schools have not on the whole institutionalized support for reflective teaching. Teachers embark on innovations without the time and opportunity required for resolving the classroom problems they pose. Perhaps in this initial stage, we should have concentrated more on the selection of schools than the recruitment of teachers. There is probably a strong correlation between the opportunities an institution allows for practical reflection and the ability of the teachers who work in it to be aware of gaps between aspirations and practice.

Many teachers at the conference felt not only that they didn't have time to reflect about problems but also that there was little point in doing so. They assumed they were already using inquiry/discovery teaching quite successfully. Later we learned that some teachers decided to get involved simply because they were already "doing inquiry/discovery" and involvement might bring rewards with a minimum of effort. Another, smaller group of teachers appeared to lack any commitment to inquiry/discovery approaches at all. We later discovered that these teachers had simply come at the "invitation" of their headteachers, to whom they were reluctant to say no.

During the first term of the project, it became clear that in the majority of cases, action research was simply not getting off the ground.

Regular team meetings materialized in only two schools. A small minority of teachers used field notes, tape-recorded their lessons, and discussed classroom problems with students. The majority asked students to keep diaries, but reported little evidence of any deeper thinking beyond "it was a bit boring" or "the lesson was all right." Feedback from schools was sparse. About two-thirds of the teachers appeared to believe they had few problems in implementing inquiry/discovery approaches successfully.

This early experience led to further developments in the project's design. Clearly, our problem was how to motivate the majority of teachers to adopt a reflective stance on their practice. We therefore defined a second-order action-research role for ourselves--namely, that of developing practical hypotheses on how to initiate teachers into the activity of reflecting about their practice. It was in this context that the idea of the <u>self-monitoring teacher</u> began to crystallize as the key concept for the second-order research. Self-monitoring is the process by which people become aware of their situation and their own role as an agent in it. However, self-monitoring, although a necessary condition of awareness, is by no means sufficient. It expresses an objective attitude toward situation and self and indicates that certain subjective obstacles to awareness have been overcome, for example, those of bias and prejudice.

The concept of self-monitoring clarified for us what was involved in practical reflection. In its light one can make a clear distinction between the following:

- teachers who are adopting an objective stance on their practice, but require support in

collecting and analyzing more sufficient data as a basis for constructing accurate accounts;

- teachers who are not adopting an objective stance, but inasmuch as they sense or feel their situation to be problematic, are ready to do so;
- teachers who are neither ready nor able to adopt an objective stance on their practice.

We now think that at the beginning of the project only 1 of the 40 teachers was self-monitoring to any significant extent. Another 12 probably had some genuine sense that their teaching was problematic. Two-thirds of the teachers fell into the third category.

Teachers' Theories of Teaching

The negotiation of tasks, roles, procedures, and methods was not the only aim of the first conference. We wanted the teachers to begin to explore typical problems. The discussions were marked by apparent communication difficulties. Different teachers appeared to use different terms without it being clear if they meant similar or different things by what they said. They also appeared to use the same terms, but to disagree in their application. We felt that if teachers were subsequently going to share ideas, they would have to develop a common language for talking about classrooms together. We listened to the recordings of the discussions and found that a number of terms tended to be used again and again in teachers' judgments about teaching situations. We invited teachers to discuss the meanings of these terms at team and regional meetings and to report back. We also went into schools and discussed them with teachers. As a result, three main dimensions of terms emerged:

1. formal/informal, which described the degree of intellectual dependence/independence of students on the teacher's authority position;

2. structured/unstructured, which described the degree to which teachers were concerned with getting students to achieve preconceived knowledge outcomes;

3. directed/guided/open ended, which described methods by which the teachers tried to implement their aims.

Discussions and interviews with teachers about the meanings of terms also clarified apparent disagreements about the application of terms. Teachers held different views about which terms were compatible. For example, some teachers associated an informal classroom with unstructured teaching and saw it as incompatible with a structured approach. For others, there was no such incompatibility. It became clear that the ways in which these meanings were associated with each other in teachers' minds reflected their theories of inquiry/discovery teaching. The following associations and implicit theories were elicited:

1. Informal-structured-guided--A teacher can pursue preconceived knowledge outcomes by guiding students toward them without imposing constraints on students' ability to direct their own learning.

2. Informal-structured-open ended--A teacher can pursue preconceived knowledge outcomes and foster and protect self-directed learning by concentrating solely on removing constraints and refraining from any kind of positive intervention in the learning process.

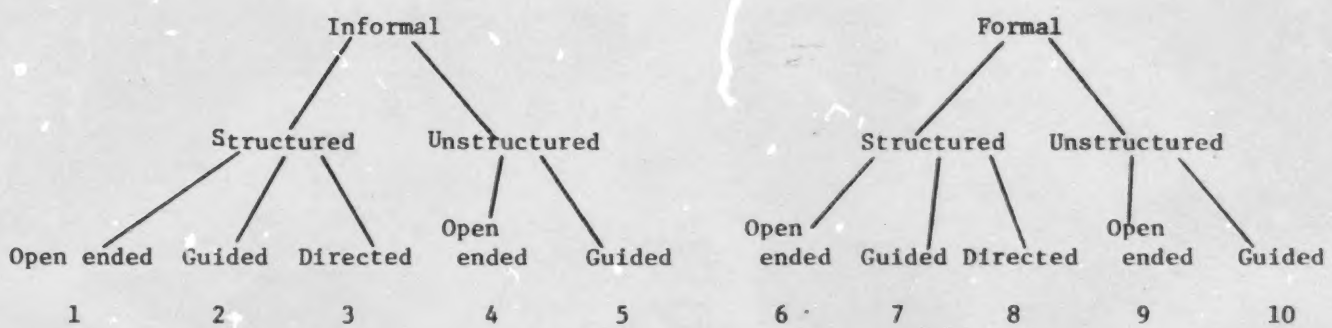
3. Informal-unstructured-guided--A teacher can foster and protect self-directed learning and exercise positive influence on the learning process so long as this influence is not exerted in the direction of bringing about preconceived knowledge outcomes.

4. Informal-unstructured-open ended--A teacher cannot foster and protect self-directed learning and pursue preconceived knowledge outcomes or exercise positive influence on learning processes. Strategies must be restricted to protecting self-direction on the part of the student.

5. Formal-structured-directed--A teacher fails to protect self-directed learning in pursuing preconceived knowledge outcomes in a way that is intended to make the student intellectually dependent on the teacher's authority position.

During the second term of the project we asked teachers to identify which of these theories guided their own practice and to test the extent to which the theory accurately described it. For example, if teachers became aware that they were adopting a structured-guided approach, they would know that theory #1 was tending to guide their practice. They could then test the extent to which it was being realized by assessing whether their approach actually protected and fostered self-directed learning. If it didn't, then they needed to generate new theory.

The list above was derived empirically and described a number of theories that actually informed our teachers' practice. However, it did not represent the full range of logically possible theories. By relating the categories in terms of all their logically possible combinations we eventually produced the following typology of practical theories:



The categories generated from our discussions and interviews with teachers provided the basis for theory clarification, testing, and development in the project. They furnished a framework not only for discussions between teachers, but also for dialogue between teachers and us. So many past attempts to produce theories of teaching have been practically fruitless because researchers have refused to take into account the perspectives of practitioners and to build theory from this standpoint.

Criteria for Testing Practical Theories of Inquiry/Discovery Teaching

Both at the initial conference and in later discussions and interviews with teachers it was clear that they characterized inquiry/discovery teaching as an attempt to protect and foster self-direction in the learning situation. However, "self-directed learning" is a rather abstract idea. We thought we could help teachers in the task of testing and developing theory if we could analyze it into more concrete criteria. We believed that "self-directed learning" should be conceived as a procedural aim--that it would distort its nature as a process criterion to view it as an end-product or object of mastery by students.

We suggested that the aim of protecting and fostering self-directed learning could be analyzed into the following "freedoms" for students:

- freedom to identify and initiate their own problems for inquiry;
- freedom to express their own ideas and develop the ideas into hypotheses;
- freedom to test their ideas and hypotheses against relevant evidence;
- freedom to discuss ideas, that is, freedom to defend their own ideas in the light of rational criteria and to bring these criteria to bear on the ideas of others, including those of the teacher.

In order to exercise these freedoms two sets of conditions are necessary. First, students must be free from external constraints on their ability to exercise the freedoms. Second, students must also possess the necessary intellectual capacities if they are to exercise the positive freedoms. For example, students may be free from constraints on the expression of certain ideas, but be unable to express the ideas because they lack the necessary concepts.

Using the four freedoms and two sets of conditions, we identified two clusters of principles that specify teachers' responsibilities for creating the conditions that are necessary to realize self-directed learning:

Negative Principles

- refrain from preventing students from identifying and initiating their own problems;
- refrain from preventing students from expressing their own ideas and hypotheses;
- refrain from restricting students' access to relevant evidence and preventing them from drawing their own conclusions about it;
- refrain from restricting students' access to discussion.

Positive Principles

- help students develop the capacity to identify and initiate their own problems;
- help students develop their own ideas into testable hypotheses;
- help students evaluate evidence in light of its relevance, truth, and sufficiency;
- help students learn how to discuss.

The negative principles provide criteria for assessing the extent to which the teaching approach protects self-directed learning and there-

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by maintains an informal learning context. The positive principles provide criteria for assessing the extent to which the capacity for self-direction is being positively fostered by the teacher within informal learning contexts.

About halfway through the second term, we circulated a document that included both the categories and theories we had derived from discussions with teachers and the criteria for testing theories we had analyzed from teachers' aims. We hoped the document would provide some guidelines for self-monitoring in the classroom. However, we realized that it would only be useful for those teachers who had already begun to question their own practical theories. Fortunately, over the previous months we had begun to make some progress in this direction.

Triangulation as a Method of Initiating Self-Monitoring

During the first term of the project the need to develop strategies that would motivate the majority of our teachers to self-monitor their practice became apparent. We finally decided to use triangulation. Triangulation involves gathering accounts of a teaching situation from three quite different points of view, namely, those of teachers, students, and participant-observers. Each point of the triangle stands in a unique position with respect to access to relevant data about a teaching situation. Teachers, via introspection, have the best access to their own intentions and aims in the situation. Students are in the best position to explain how teachers' actions influence the way they respond in the situation. Participant-observers can best collect data about the observable features of the interaction between teachers and students.

We initiated a triangulation procedure in some teachers' classrooms and then circulated some full sets of data gathered in this way to all the other teachers in the project. Realizing that triangulation can be a threatening process, we only selected those teachers whom we believed to be ready to self-monitor their practice in some depth. We hoped that they would also be prepared to let other teachers have access to the data gathered in the process.

Because the teachers we selected had not been successful in eliciting honest feedback from students, we took the initiative in collecting accounts as participant-observers. This fact determined the techniques we used. We tended to have a post-lesson interview with the teacher before interviewing the students (interviews were recorded on tape). This procedure enabled us to identify the kinds of data we needed to collect from students if the teacher was to have an opportunity to compare two accounts of the same event. It also enabled us to identify discrepancies between the teacher's account and our own, which then provided further criteria for eliciting relevant information from students.

The danger of interviewing the teacher first is that it leads to an overstructured interview with the students. There is also a danger that the participant-observer will overstructure the interview with the teacher. To avoid these dangers, we tried to work from the teacher's or students' own judgments about which features of the lesson were significant, introducing our own agenda when it matched theirs or was a natural development of it.

We also exercised the initiative in negotiating the teacher's access to student accounts. We only interviewed students (in groups)

with the teacher's permission, and we made it clear that teacher access to the students' accounts would have to be negotiated with the students. As participant-observers, we had a significant role to play in creating conditions of trust between teachers and students. Students generally feared their teacher's reaction. We found that when teachers were able to conform to the conditions of access negotiated with students through us, and demonstrate an open attitude toward their comments, they were increasingly able to collect their own accounts without our help. As the project progressed, we found that many of our teachers began to initiate triangulation procedures for themselves.

As well as observing, and in the initial stages interviewing, we recorded lessons. If the classroom was highly centralized, we used tape recordings. If the classroom was decentralized, we adopted a tape-slide technique. The teacher wore a microphone that picked up interchanges with students as he or she moved around the classroom, and we took photographs (pulsed onto the tape) that helped to place the interchanges in a visual context. Our recordings were used both in interview situations and by teachers when comparing accounts. In post-lesson interviews with teachers we sometimes adopted the device of playing the tape recording and allowing them to stop it and comment when they wanted to. It helped them to reconstruct classroom events and gave them more than memory to go on. We also found this approach useful in interviews with students.

Teachers frequently cited the collection of student data as that part of the process that aroused the greatest anxiety for them. This anxiety was carried into local interschool meetings. Those who had been involved in the triangulation studies discussed their experience

with those who were not involved. Following is an episode from one such discussion:

District Supervisor	Do children feel they are being inspected in any way?
Secondary Teacher (A)	No I don't think so--they will often open up with them.
Primary Teacher (B)	Pupils will open up with strangers who are just inquiring. Whereas they know the teachers are trying to find out what they know and therefore they try to give the "correct" response.
Secondary Teacher (A)	...all that he [John Elliott] got from them was all criticism of the lessons.
Secondary Teacher (C)	This attempt to get frankness can obtain complete nonsense from the children and often means that later a more authoritarian approach has to be adopted with them.
Secondary Teacher (D)	I feel that this can cause trouble.
Secondary Teacher (E)	The children can in fact give false information. Children do not talk frankly.
Secondary Teacher (C)	Possibly children may like the idea that talking to the project team reflects an unfavorable image. To what extent do children realize the uniqueness of John Elliott's position? (as an outsider coming in to interview)

We only attended the interschool meetings on request because we felt that our absence would allow teachers to feel freer to criticize our role.

With the permission of the teachers and headteachers involved, some of the early triangulation studies were circulated to other

teachers in the project. The studies also provided the basis for discussion at our interim conference at the end of the second term. At this conference they were used as data for testing the practical theories of the teachers studied.

The circulation of triangulation data around schools, discussions between teachers at local interschool meetings, and the experience of the interim conference began to take effect during the third term. Many teachers began to feel freer to look at and share their own classroom problems once others had demonstrated a willingness to do so. We discovered the crucial role local interschool meetings and central conferences played in this respect. The school-based teams, with two notable exceptions, collapsed as a basis for sharing ideas and classroom data. This was partly due to lack of institutional support and partly to the fact that in secondary schools, feelings of interdepartmental competition prevented the members of the interdisciplinary teams from exposing their teaching to each other. Teachers felt more able to share their classroom data with teachers from other schools. With the collapse of school-based teams the local meetings became the main setting for sharing ideas and experience for the majority of the 30 teachers who by this time remained attached to the project.

During the third term, about 24 teachers were actively engaged in studying their own teaching in some form. Only about 6 adopted the full-blown triangulation method, but the others began to use some of the methods suggested at the first conference. Some recorded lessons or parts of them regularly, others kept field notes, and there was an increase in the general effort to obtain honest feedback from students.

In general, teachers tended to find their own level of research activity. They adopted methods that produced illuminating but not overwhelming data. They worked gradually from the least to the most threatening. Our observations of this process suggested that triangulation should appropriately come at the end of attempts to develop self-monitoring potential with teachers who are largely unreflective about their practice. We would in retrospect suggest that teachers need to work through the following sequence of activities:

1. listening or viewing recordings of their teaching situation;
2. listening or viewing recordings and then systematically trying to note salient patterns in their classroom behavior;
3. #2 plus dialogue with a participant-observer;
4. #3 plus dialogue with students about pedagogic values;
5. triangulation controlled by participant-observer;
6. triangulation controlled by the teacher.

At the end of this process teachers should be able to act as participant-observers in each other's classrooms. Indeed during the second half of the project we found an increasing number of teachers able to do this productively. Their main problem, again, was gaining opportunities in their schools to do this.

Developing Hypotheses from Classroom Data

The data collected by triangulation and other methods enabled teachers, in dialogue with us as participant-observers, to clarify and test the theories implicit in their practice. As a result some teachers generated new theories.

Following is an illustration of how one teacher used triangulation data:

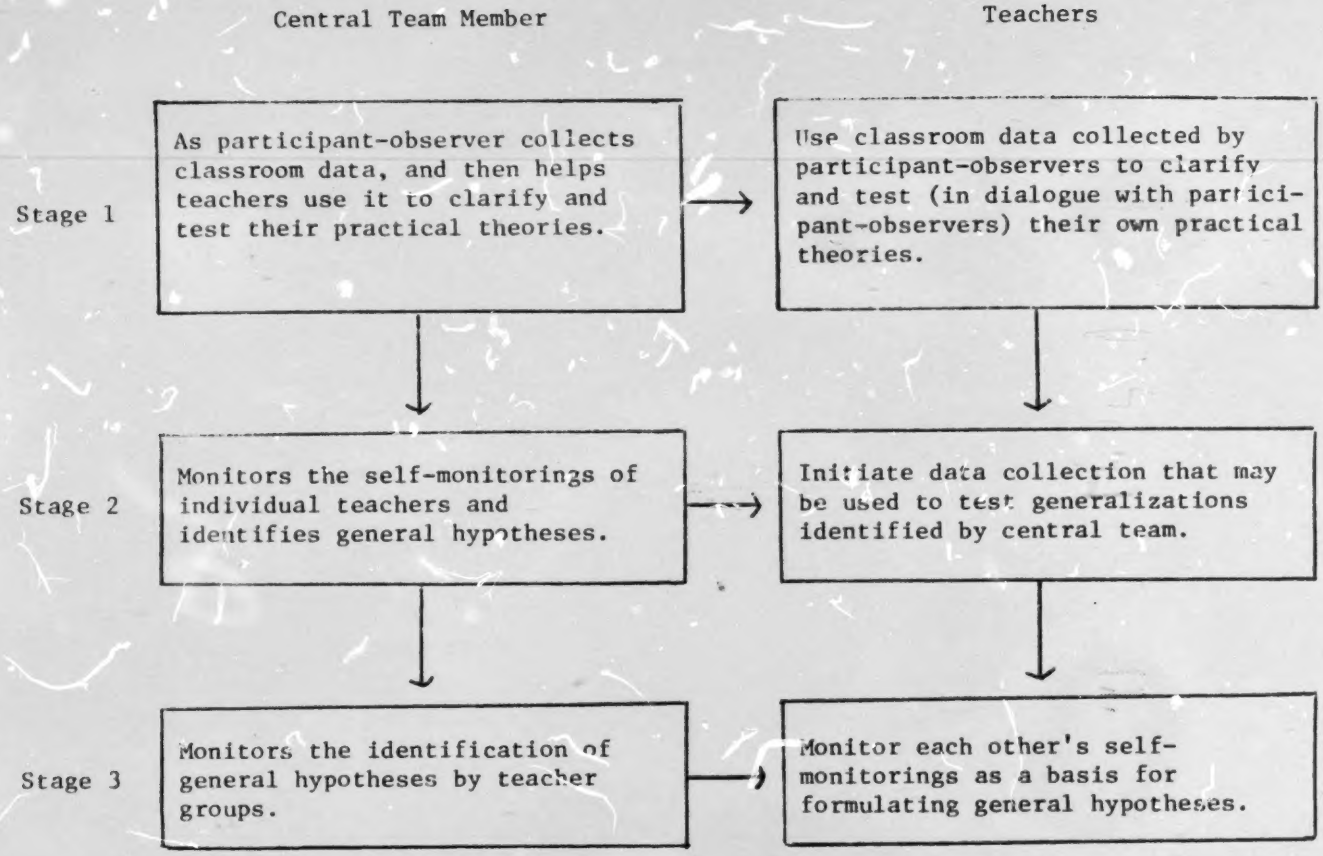
> The students argued that the teacher imposed constraints on their freedom to express their own ideas. On their own initiative they cited the behavior, "Do you all agree with that?" as a way in which the teacher imposed constraints by indicating the idea he wanted expressed. The participant-observer noted the teacher behaviors that appeared to indicate the outcomes desired and student responses to these behaviors. He noted the "Do you all agree?" behavior and students' responses to it. His observations were supported by the recording. The teacher also accepted that he said "Do you all agree with that?" frequently and described the intention behind it as "asking for assent." Gradually the normative implications of his practice began to dawn on him. The data convinced him that in spite of his professed aspirations to implement inquiry/discovery approaches, his teaching was in fact formal-structured-directed and that his behaviors deliberately fostered his students' dependence on his authority position. Having clarified and tested the theory implicit in his practice in this way, he later dramatically switched to an unstructured-open-ended approach that he hoped would protect the self-directed learning of his students. His conscious switch to a new teaching approach reflected the development of a new theory, the applicability of which would require further self-monitoring.

From triangulation and other classroom data we began to identify practical theories that not only applied in individual instances but also appeared to have a more general applicability. By formulating them as "general hypotheses" and then circulating them to all teachers, we hoped they would provide a focus for self-monitoring activity. In exploring the applicability of the hypotheses to their particular situation teachers would necessarily have to clarify and test their own practical theories. We realized there was a danger that teachers would not test the hypotheses but simply accept or reject them in the light of their perceived consistency or inconsistency with the teachers' own theories. However, this danger was somewhat reduced because the first batch of general hypotheses was not introduced until the end of the

second term when an increasing number of teachers had already started to engage in some form of self-monitoring.

The rest of the general hypotheses were formulated toward the end of the final term of the project. They emerged partly as the product of further theory testing with teachers and partly from autonomous studies by teachers. During the final term of the project several teachers embarked on case studies of work with a particular class over that term. Twelve studies were eventually written up. They contain evidence of teachers clarifying, testing, and generating theory. Our role on the central team was increasingly that of monitoring the self-monitorings of individual teachers with a view to identifying hypotheses that might have some generalizing power. But as these were introduced and tested by more and more individuals, we found that discussions at local interschool meetings began to focus on the generalizable features of life in classrooms. In other words teachers were increasingly able to monitor each other's studies and formulate their own general hypotheses. We estimated that about 12 teachers were in this position at the end of four terms.

The shifts in central team and teacher roles in theory development during the life of the project can be crudely represented as follows:


Central Team Member
Teachers
Stage 1
As participant-observer collects classroom data, and then helps teachers use it to clarify and test their practical theories.
Use classroom data collected by participant-observers to clarify and test (in dialogue with participant-observers) their own practical theories.
Stage 2
Monitors the self-monitorings of individual teachers and identifies general hypotheses.
Initiate data collection that may be used to test generalizations identified by central team.
Stage 3
Monitors the identification of general hypotheses by teacher groups.
Monitor each other's self-monitorings as a basis for formulating general hypotheses.